

M/053/002

LEEDS SILVER REEF SITE
WASHINGTON COUNTY, UTAH

WORK PLAN

PREPARED FOR
U. S. ENVIRONMENTAL PROTECTION AGENCY
DISTRICT EIGHT
DENVER, COLORADO

PREPARED BY
U. S. BUREAU OF RECLAMATION
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TABLE OF CONTENTS

	Page
OBJECTIVE	1
EQUIPMENT AND MATERIALS	1
REPORTING REQUIREMENTS	1
1.0 TASK ONE. Site Mapping and Survey	1
Site Survey and Mapping Objectives	1
Site Mapping and Survey Course of Action	1
Site Mapping and Survey Schedule	2
Task One Budget	3
Survey Deliverables	3
Mapping Heap	3
Mapping Ore Stockpile	4
Mapping Ponds	4
Mapping Public Well	4
Mapping Asphalt Pad	4
Mapping Seeps From Dike	4
Mapping Fence Alignment	5
2.0 TASK TWO. Drilling and Augering	5
Drilling and Augering Work Objectives	5
Drilling and Augering Course of Action	5
Drilling and Augering Schedule	5
Task Two Budget	6
Drilling and Augering Deliverables	6
Install Water Level Monitoring Wells	6
Obtain Deep Soil Samples at Heap	7
Obtain Clay Soil Samples for Cap	7
Identify Water Source for Construction	7
Locate and Identify Other Additive Sources to Neutralize the Heap	7
Water Monitoring	7
3.0 PERSONNEL	8

OBJECTIVE:

Development of a final work plan for the Leeds Silver Reef site requires collection of additional data needed to prepare a work plan incorporating treatment alternatives. This data will be generated by Reclamation Personnel following the completion of various survey and testing activities. These activities will take place during a site visit-work trip between the period of Jan. 14, 1993 to Jan. 29, 1993.

EQUIPMENT AND MATERIALS:

Detailed lists will be supplied by Roe Allman (PRO-184).

REPORTING REQUIREMENTS:

Interim and final reports will be prepared and submitted by Reclamation. Interim reports of the results of the sampling and testing and the maps generated from the survey and locating work will be assembled into a work-plan supplement by Reclamation and made available to interested parties.

1.0 TASK ONE: SITE MAPPING AND SURVEYS.**SITE SURVEY AND MAPPING OBJECTIVES:**

A topographic survey is required to produce design drawings. These drawings will show the location of existing features including observation holes and topography.

SITE MAPPING AND SURVEY COURSE OF ACTION:

A Reclamation Survey Crew will complete the topographic surveys and mapping of features. The survey will consist of horizontal and vertical control for each feature, where practical. All ditches will be surveyed to determine location and elevation with grade, width and depth. All surveys will be performed by experienced survey personnel using a total station and automatic data collectors.

Vertical and horizontal points will be located at approximately 50 to 75 foot intervals depending on the existing relief. Shots will also be taken on all pertinent features and wherever a major grade change occurs. The topographic maps will be used to determine volumes and to assist in the reestablishment of the grade and elevations during construction.

Control points, tied to the Utah State Plane Coordinate System, will be used as the basis for horizontal and vertical control. All horizontal and vertical shots will be accurate to the nearest 0.1 foot.

The survey data will be downloaded into a personal computer and incorporated into an Autocad drawing. Engineering and design software will be utilized to create surface models from which contours can be generated and earthwork volumes determined.

SITE MAPPING AND SURVEY SCHEDULE:

Commence survey	Jan. 10, 1994
Complete survey	Jan. 15, 1994
Complete input into computer	Jan. 19, 1994
Completed drawings	Feb. 5, 1994

TASK ONE BUDGET

NAME OF EMPLOYEE	REG. HOURS	REG. RATE (\$)	O.T. HOURS	O.T. RATE (\$)	**PERSONNEL COSTS (\$)
Rick Scott, (PRO-220), Design Engineer	8	43.85	0	33.39	350.80
Curtis Roe Allman, (PRO- 184), Site Supervisor	8	40.13	0	43.41	321.04
Rich Thalman, (PRO-183), Survey Chief	70	35.13	20	38.97	3238.50
Dave Johnson, (PRO-187) Engineering Technician	50	29.98	20	30.20	2103.00
Rick Sweat, (PRO-1516), Operator	8	32.69	0	31.50	261.52
Gordon Bell, (PRO-189), Engineering Technician	40	27.54	10	27.43	1375.90
Diane Loft, (PRO-213), Engineering Draftsman	60	25.96	0	0.00	1557.60
TOTAL PERSONNEL COSTS:					9208.36

** All personnel costs include overhead and additives.

TRAVEL EXPENSES FOR TASK ONE 16 days at \$ 72.00 \$ 1,152.00
TOTAL COST FOR TASK ONE \$ 10,360.36

SURVEY DELIVERABLES:

Completed drawings and Survey Report Feb. 5, 1994

MAPPING HEAP:

Using the survey data generated in Task 1, the total volume of material incorporated in the Heap will be calculated to establish the amount of work and the cost to complete a remediation.

MAPPING ORE STOCKPILE:

Using the survey data generated in Task 1, the total volume of ore stock piles will be calculated to establish the amount of work and the cost to complete a remediation.

MAPPING PONDS:

The area of the ponds will be calculated to establish both the amount of acid water that will need to be treated and the amount of backfill material needed to backfill them. The volume of sediment to be removed will be determined through testing the sediment layers for depth of contamination in the pond bottom, while at the same time establishing the extent of the horizontal deposition.

MAPPING PUBLIC WELL:

Reclamation will survey and locate the well in relation to the Leeds Silver Site. The potential for contamination of the public well in the local area will be addressed by establishing the location of the well in relation to the Heap Leach Pad and identify possible water communication through the soil.

MAPPING ASPHALT PAD:

Reclamation will survey and locate the asphalt pad, as well as cracks in the pad. The asphalt pad, existing both under and around the Heap Leach pad and the ponds needs to be located and characterized for use in final work plan. This will also provide information if additional material can be moved and stored on the pad.

MAPPING SEEPS FROM DIKE:

The continuing escape of contaminants from the impoundment inside the dike can be addressed if the location and volume of the seeps are known. This will permit the planning of needed activity to enhance the retention capability of the dike, or give direction to needed repairs that will improve the retention capability if necessary.

MAPPING FENCE ALIGNMENT:

The possible requirement for enclosure of the area will mandate mapping to establish property lines and boundaries. The installation of a suitable fence by others, requires exact location of corners, gates, access routes and etc.

2.0 TASK TWO: DRILLING AND AUGERING.**DRILLING AND AUGERING WORK OBJECTIVES:**

The development of a work plan requires sampling and sample collection at Leeds site. These activities will provide information to identify contamination distribution and generation, water table levels and subsurface flow patterns, and the location of in-situ materials that may be used in the work at the site.

DRILLING AND AUGERING COURSE OF ACTION:

Reclamation will provide a Texoma auger to the Leeds site from the Provo Projects Office (PRO). Monitoring wells will be installed and soil samples will be taken at various locations at the site. Selected samples from these borings will be tested at Reclamation contract Laboratory for contaminants. For establishing construction properties of the soil the (PRO) Construction Quality Control Laboratory will be used.

DRILLING AND AUGERING SCHEDULE:

Reclamation will begin the drilling program upon the recommendations by the Design Engineer and Technical Specialists at the site. These activities will commence upon arrival at the site Jan. 10.

TASK TWO BUDGET: DRILLING AND AUGERING.

NAME OF EMPLOYEE	HOURS	RATE (\$)	**PERSONNEL
	REG	REG	COSTS
	O.T.	O.T.	(\$)
CLARK WHITLOCK; (PRO-180)	8	43.85	350.00
FIELD SUPERVISOR	0	33.39	
C. ROE ALLMAN; (PRO-184)	30	40.13	1,203.90
SITE SUPERVISOR	10	43.41	434.10
RICK SWEAT; (PRO-1516)	40	32.69	1,307.60
OPERATOR	10	31.50	315.00
TOTAL PERSONNEL COSTS:			3,610.60

** All personnel costs include overhead and additives

TRAVEL EXPENSES FOR TASK TWO 8 days at \$ 72.00 \$ 576.00
TOTAL COST FOR TASK ONE \$ 4,186.60

DRILLING AND AUGERING DELIVERABLES:

1. A completed map showing the surveyed boring Feb. 5, 1994
locations, the groundwater depths, and flow directions.
2. Field logs of each boring. Feb. 5, 1994
3. Test Results from both the contamination Feb. 5, 1994
sampling and the construction materials analysis.

INSTALL WATER LEVEL MONITORING WELLS:

Water level monitoring holes will be installed at selected locations in the area. These monitoring holes will provide information about potential water problem locations. Monitoring schedules will be formulated after completion of installation if necessary.

OBTAIN DEEP SOIL SAMPLES AT HEAP:

Hand augers may be used to bore auger holes into the piles to obtain tailings samples for analysis and to establish their depths.

OBTAIN CLAY SOIL SAMPLES FOR CAP:

An attempt will be made to locate a clay source using both the Texoma and hand augers. If the clay source is located it may be necessary to identify the depth and extent of the source. Alternative offsite sources may also be identified. The samples will be analyzed at Reclamation's Materials Control Laboratory at (PRO) for identification of soil type, permeability and properties using standard ASTM testing methods.

IDENTIFY WATER SOURCE FOR CONSTRUCTION:

Water contamination and metals content have been analyzed during the field investigation by the EPA ERT July 1993.

Non - contaminated water for use in the clean-up action must be located and quantified for inclusion in the final plan.

LOCATE AND IDENTIFY OTHER ADDITIVE SOURCES TO NEUTRALIZE THE HEAP:

Reclamation is presently doing pilot studies for EPA, at Summitville, Colorado on a existing heap leach pad. As part of this study the use of a lime (high PH) material is being evaluated with favorable results. Reclamation will identify the available locations of this neutralizing material and the costs associated with its use.

WATER MONITORING:

Water table observation holes may need to be monitored at a later date for both depth and PH content.

3.0 PERSONNEL

1. **Rick Scott, Design Engineer and Branch Chief,** Provo Projects Office, will direct the engineering study associated with this project.

2. **Clark Whitlock, Hazardous Waste Field Supervisor,** Provo Projects Office, (PRO-180) will be responsible for coordinating the work, adjusting schedules of personnel and equipment, and review field work to ensure methodology is adequate.

3. **Roe Allman,** Provo Projects Office, (PRO-184) will be the Site Supervisor and site Safety and Health Officer, directing on site activities of surveying, sampling, mapping of asphalt pad, and handling paperwork on the materials selected to be tested, as well as public contact responsibilities and Safety and Health coordination. Personnel from the Hazardous Waste Branch of the Provo Projects office will provide field labor for these activities, with estimated labor force of four technicians required.

4. **Richard Thalmann,** Provo Projects Office, (PRO-183) will be the party chief directing the survey work in the field and be responsible for location and accuracy of survey, methodology, and will assist in correction of any errors.

Members of the survey crew will be selected from those individuals, with previous surveying experience, currently working within the Hazardous waste branch of the Provo Projects Office.

5. **Gorden Bell,** Engineering Technician, will assist with surveying and installation of the water monitoring wells, and sampling if that activity is directed.

6. **Dave Johnson**, Engineering Technician, will assist with surveying and installation of the water monitoring wells, and sampling if that activity is directed.

7. **Rick Sweat**, Equipment operator, will be responsible for driving and operating the equipment used on the site.

8. **Diane Loft**, Engineering Draftsman, (PRO-213) will input the coordinates of all surveys into the computer and provide the maps.